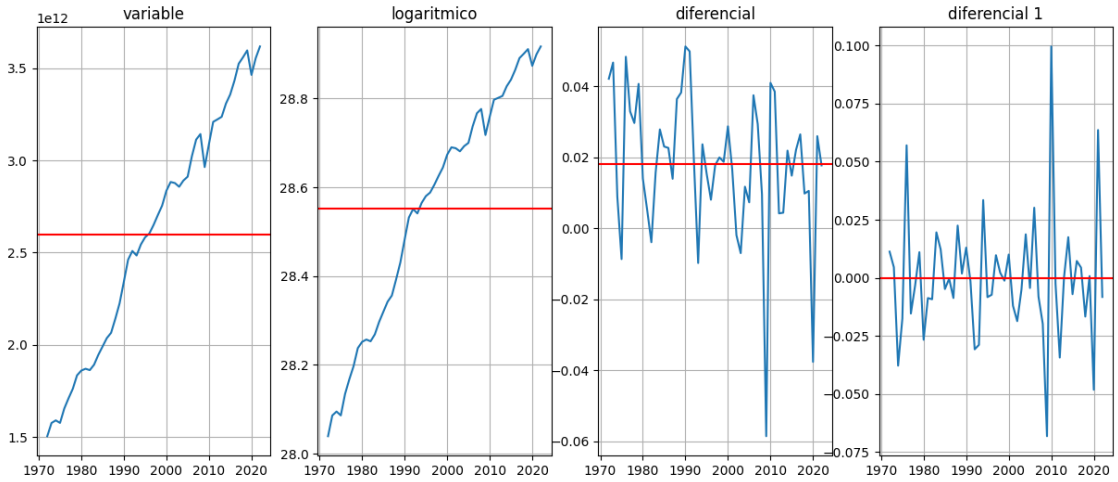
clase-7

November 29, 2023

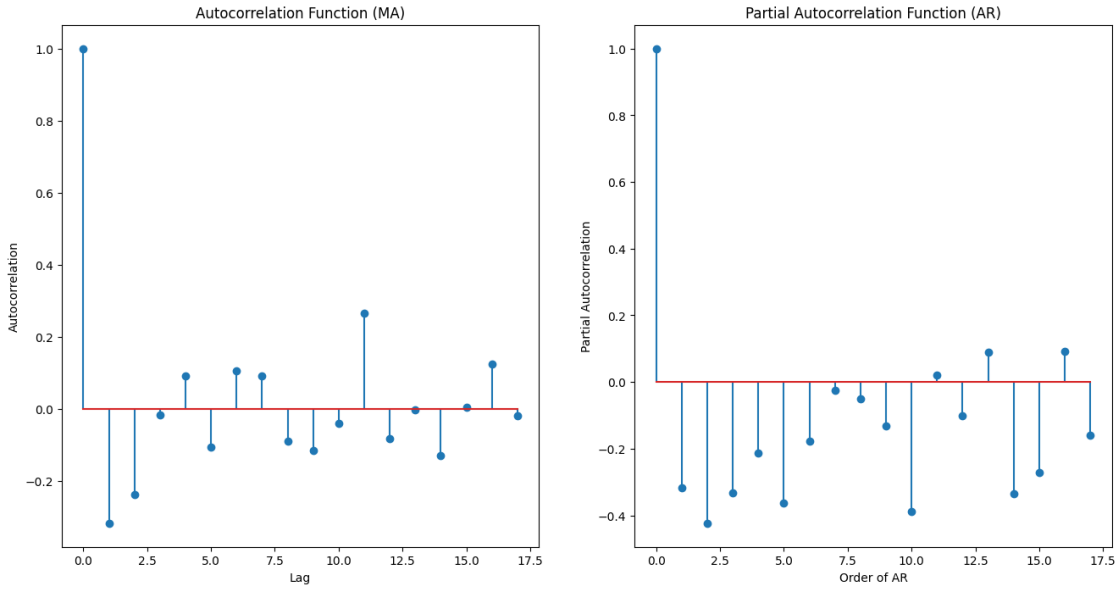
[1]:
```
import Codigo as cg
import matplotlib.pyplot as plt
data = cg.EleccionDatos('../Alemania_Reducida.csv', "PIB (US")
```

```
['PIB (US$ a precios actuales)', 'PIB (US$ a precios constantes de 2010)']
```

[2]:
```
dt = data['PIB (US$ a precios constantes de 2010)']
dt = cg.VariableTotal(dt)
dt['diferencial 1'] = dt['diferencial'].diff(1)
dt.dropna(axis = 0, inplace = True)
cg.Total_graphs(dt)
```



[3]:
```
plt.figure(figsize=(16,8))
plt.subplot(1,2,1)
cg.acf_ma(dt['diferencial 1'], inx = 0)
plt.subplot(1,2,2)
cg.pacf_ar(dt['diferencial 1'])
```



[4]:
```
cg.Regresiones(dt['diferencial 1'], 5)
```

OLS Regression Results

Dep. Variable:	variable	R-squared (uncentered):	0.980
Model:	OLS	Adj. R-squared (uncentered):	0.978
Method:	Least Squares	F-statistic:	410.5
Date:	Tue, 28 Nov 2023	Prob (F-statistic):	7.14e-34
Time:	23:06:16	Log-Likelihood:	193.21
No. Observations:	46	AIC:	-376.4
Df Residuals:	41	BIC:	-367.3
Df Model:	5		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
variable 1	0.1689	0.019	8.776	0.000	0.130	0.208
variable 2	0.2050	0.019	11.056	0.000	0.168	0.242
variable 3	0.2111	0.018	11.504	0.000	0.174	0.248
variable 4	0.1612	0.020	7.959	0.000	0.120	0.202

```
variable 5     0.1287      0.021      6.086      0.000       0.086       0.171
==============================================================================
Omnibus:                        0.785   Durbin-Watson:                   1.102
Prob(Omnibus):                  0.675   Jarque-Bera (JB):                0.878
Skew:                          -0.247   Prob(JB):                        0.645
Kurtosis:                       2.538   Cond. No.                         3.13
==============================================================================

Notes:
[1] R² is computed without centering (uncentered) since the model does not
contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly
specified.
```

[9]:
```
resultados, pval = cg.ModeloARMA(dt['diferencial 1'], 0,1, trend = [0])
print(resultados.summary())
```

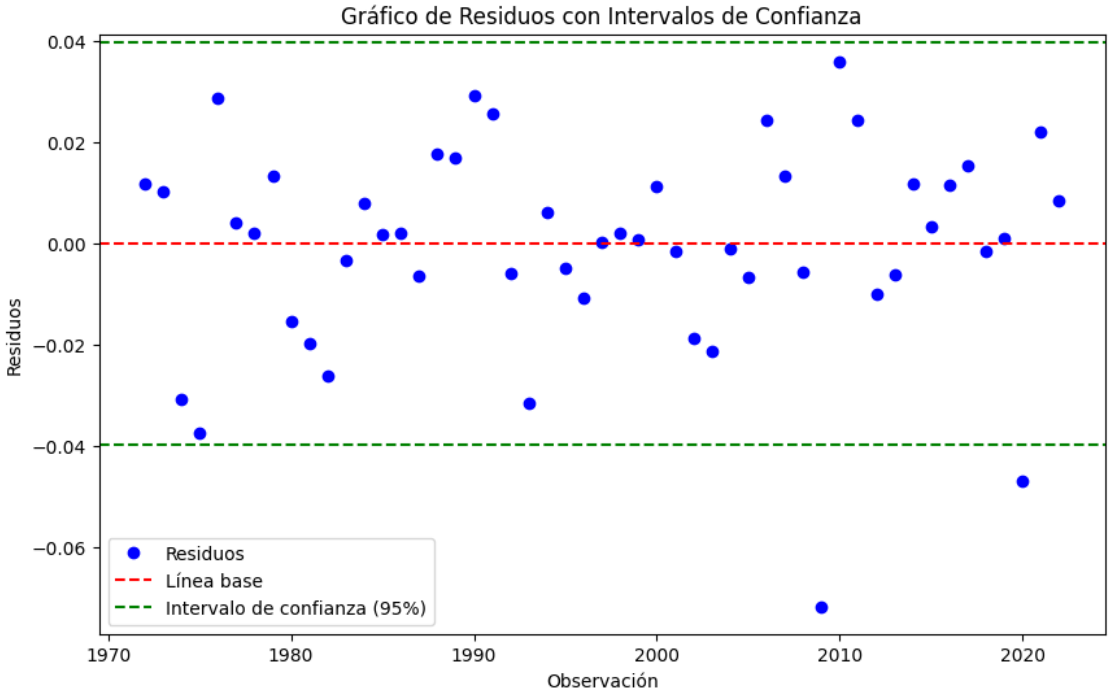
```
                               SARIMAX Results
==============================================================================
Dep. Variable:          diferencial 1   No. Observations:                   51
Model:                 ARIMA(0, 0, 1)   Log Likelihood                 124.836
Date:                Tue, 28 Nov 2023   AIC                           -245.671
Time:                        23:06:33   BIC                           -241.807
Sample:                             0   HQIC                          -244.195
                                  - 51
Covariance Type:                  opg
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
ma.L1         -0.9246      0.079    -11.715      0.000      -1.079      -0.770
sigma2         0.0004   6.06e-05      6.950      0.000       0.000       0.001
==============================================================================
===
Ljung-Box (L1) (Q):                   0.21   Jarque-Bera (JB):
20.19
Prob(Q):                              0.65   Prob(JB):
0.00
Heteroskedasticity (H):               2.30   Skew:
-1.12
Prob(H) (two-sided):                  0.10   Kurtosis:
5.12
==============================================================================
===

Warnings:
[1] Covariance matrix calculated using the outer product of gradients (complex-
step).
```

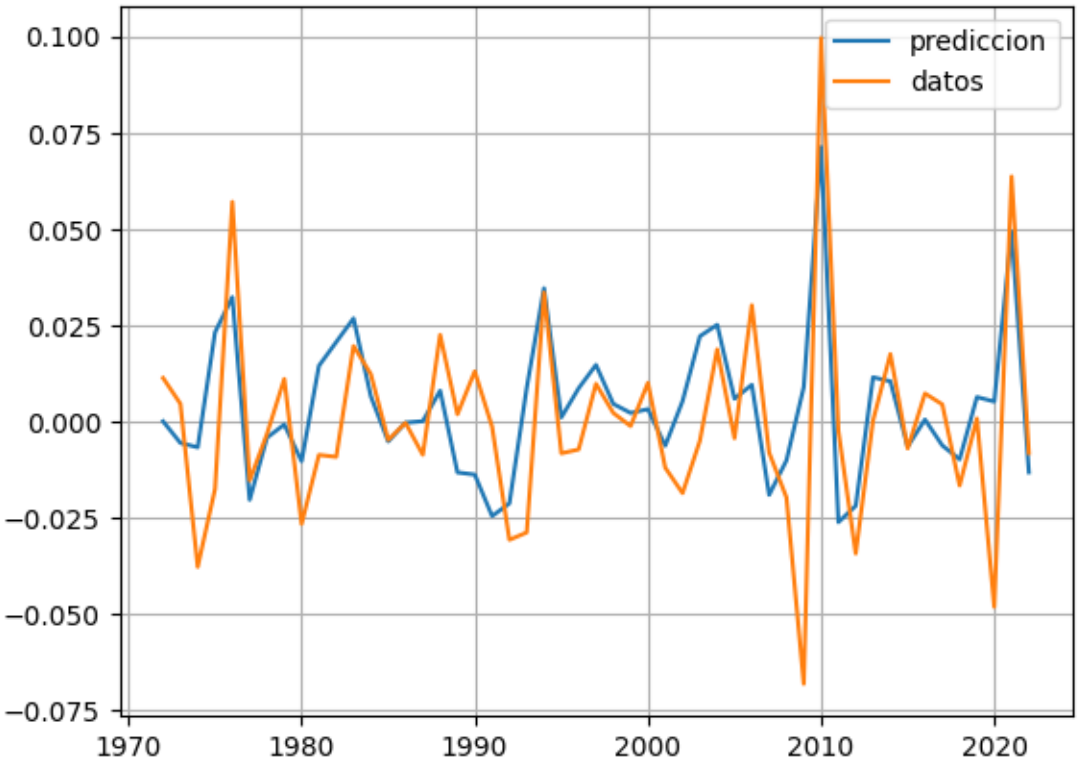
[6]:
```
# Aqui creamos un sistema logico que busque el mejor tomando en cuenta los los␣
↪pvalores y el akaike menor
import pandas as pd
cg.Pruebatoolkit(dt['diferencial 1'], 8,trend = [0], p_value= 0.05)
```

```
Mejor orden encontrado: (0, 1) con AIC: -245.67108798276547
```

[7]:
```
cg.Pormanteau_test(dt['diferencial 1'], 1, 1, rezagos= 50)
```



[11]:
```
plt.plot(resultados.fittedvalues, label = 'prediccion')
plt.plot(dt['diferencial 1'], label = 'datos')
plt.legend()
plt.grid()
plt.show()
```


prediccion
datos
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
1970
1980
1990
2000
2010
2020